

AMENDMENTS TO THE CLAIMS

1. (Cancelled)

2. (Cancelled)

3. (Currently Amended) An image processing apparatus for correcting an original image having distortion, ~~characterized by~~ comprising:

grid splitting means for performing a grid split on the original image, according to a control signal supplied from a user interface;

an encoding means for encoding correcting parameters, derived at grid points obtained by said grid split, into a correction vector;

decoding means for decoding the correcting parameters and supplying the decoded correcting parameters;

horizontal correcting means for correcting distortion ~~[[in-]]~~ along the horizontal direction of said original image by performing a one-dimensional horizontal interpolation operation between designated pixels, corresponding to grid points, using [[a-]] horizontal correcting parameterparameters from the correction vector, wherein the horizontal correcting parameters indicating a ~~indicate~~ correction quantity of distances in the horizontal direction by which the horizontal correcting means ~~[[at a]]~~ adjusts the designated ~~pixelpixels~~ point constituting said in the original image to said original image; and

vertical correcting means for correcting distortion ~~[[in-]]~~ along the vertical direction of said original image by performing a one-dimensional vertical interpolation operation between designated pixels, corresponding to grid points, using [[a-]] vertical correcting parameters from the correction

vector, wherein the vertical correcting parameters indicating a indicate correction quantity of distances in the vertical direction ~~[[at a]]~~ by which the vertical correcting means adjusts the designated pixel ~~pixels point constituting said~~ in the original image to an image obtained by the correction of said horizontal correcting means.

4. (Currently Amended) The image processing apparatus according to claim 3, ~~characterized in that~~ wherein:

said horizontal correcting means expands and contracts said original image in the horizontal direction by ~~adjusting an interval~~ adjusting distances, calculated by said horizontal one-dimensional interpolation operation, in the horizontal direction by which ~~[[of]]~~ image data at pixel points is shifted at which image data is obtained by said one-dimensional interpolation operation; and ~~in that:~~

said vertical correcting means expands and contracts said original image in the vertical direction by adjusting distances, calculated by said vertical one-dimensional interpolation operation, ~~an interval in the vertical direction by which image data as pixels points is shifted~~ of pixel points at which image data is obtained by said one-dimensional interpolation operation.

5. (Currently Amended) The image processing apparatus according to claim 3, ~~characterized in that~~ wherein:

said horizontal correcting means ~~includes~~ further comprises,

a first data obtaining means for selectively-obtaining ~~[[said-]]~~ a first image data at
~~[[said-]]~~ pixel points according to an integer component of the horizontal correcting
~~parameter~~ parameters,

a first interpolation coefficient generating means for generating an interpolation
coefficients according to a decimal ~~component~~ components of said horizontal correcting
~~parameter~~ parameters, and

a first interpolation operating means for executing said one-dimensional horizontal
interpolation operation using said first image data obtained by said first data obtaining
means and said interpolation-coefficient coefficients generated by said first interpolation
coefficient generating means; and in that:

said vertical correcting means ~~includes~~ further comprises.

a second data obtaining means for selectively-obtaining ~~[[said]]~~ a second image data
at said pixel points according to an integer component of said vertical correcting
~~parameter~~ parameters,

a second interpolation coefficient generating means for generating an interpolation
coefficient according to a decimal components ~~component~~ of said vertical correcting
~~parameters~~ parameter, and

a second interpolation operating means for executing said vertical one-dimensional
interpolation operation using said second image data obtained by said second data
obtaining means and said interpolation coefficients ~~coefficient~~ generated by said second
interpolation coefficient generating means.

6. (Currently Amended) The image processing apparatus according to claim 3, characterized by further comprising:

a storing means for storing a horizontally corrected image ~~from obtained by the correction~~
~~of said horizontal correcting means;~~

wherein said vertical correcting means ~~includes~~further comprises

a data obtaining means for obtaining the horizontally corrected image from said storing
~~means said horizontally corrected image according to said vertical correcting parameter, and~~

a vertical interpolation operating means for performing [[a-]]said vertical one-dimensional
interpolation operation using said vertical correcting ~~parameter to~~ parameters on said horizontally
corrected image data obtained by said data obtaining means.

7. (Cancelled)

8. (Cancelled)

9. (Currently Amended) An image processing system for correcting an original image having distortion, characterized by comprising:

encoding means for selectively encoding a horizontal correcting parameter indicating a correction quantity in the horizontal direction at a pixel point constituting said original image and a vertical correcting parameter indicating a correction quantity in the vertical direction at said pixel point;

horizontal decoding means for decoding said encoded horizontal correcting parameter supplied from said encoding means;

horizontal correcting means for correcting distortion in the horizontal direction of said original image by performing a one-dimensional interpolation operation using said horizontal correcting parameter decoded by said horizontal decoding means to said original image;

vertical decoding means for decoding said encoded vertical correcting parameter supplied from said encoding means; and

vertical correcting means for correcting distortion in the vertical direction of said original image by performing a one-dimensional interpolation operation using said vertical correcting parameter decoded by said vertical decoding means to said image obtained by the correction of said horizontal correcting means;

wherein said encoding means further comprises

a grid splitting means for performing grid split to said original image according to a control signal supplied from a user interface, and

a parameter compressing means for selectively compressing said horizontal correcting parameter at a grid point obtained by said grid split and supplying the compressed horizontal correcting parameter to said horizontal decoding means, and for selectively compressing said vertical correcting parameter at said grid point and and supplying the compressed vertical correcting parameter to said vertical decoding means.

10. (Cancelled)

11. (Original) The image processing system according to claim 10, characterized in that:
said horizontal decoding means includes

first grid determining means for determining a grid frame enclosing each pixel point of a generated image, according to a grid generated by said grid splitting means, and

horizontal parameter calculating means for approximating each grid frame determined by said first grid determining means by a function, and for calculating said horizontal correcting parameter at each pixel point of said generated image by using said function; and in that:

said vertical decoding means includes

second grid determining means for determining a grid frame enclosing each pixel point of said generated image, according to a grid generated by said grid splitting means, and

vertical parameter calculating means for approximating each grid frame determined by said second grid determining means by a function, and for calculating said vertical correcting parameter at each pixel point of said generated image by using said function.

12. (Original) The image processing system according to claim 11, characterized in that at least one of said horizontal parameter calculating means and said vertical parameter calculating means approximates at least one grid frame by means of n-th order polynomial (n is a natural number).

13. (Original) The image processing system according to claim 9, characterized by further comprising:

storing means for storing a horizontally corrected image obtained by the correction of said horizontal correcting means;

wherein said vertical correcting means includes

data obtaining means for obtaining from said storing means said horizontally corrected image according to said vertical correcting parameter, and

interpolation operating means for performing a one-dimensional interpolation operation using said vertical correcting parameter to said horizontally corrected image data obtained by said data obtaining means.

14. (Currently Amended) An image processing method for correcting an original image having distortion, ~~characterized by~~ comprising:

a grid splitting step for performing a grid split on the original image based on a control signal supplied from a user interface;

an encoding step for encoding correcting parameters, derived at grid points obtained by said grid splitting step, into a correction vector;

a decoding step for decoding the correcting parameters in the correction vector and supplying the decoded correcting parameters to the image processing apparatus;

a first horizontal correction step ~~[[θ]]~~ for producing a horizontally corrected image by correcting said distortion in the horizontal direction of said original image by performing a horizontal one-dimensional interpolation operation by using a horizontal correcting parameter ~~parameters~~ indicating a correction quantity ~~distances~~ in the horizontal direction to shift at ~~a pixel point constituting pixels in said original image to said original image; and~~

a vertical correction ~~second~~ step ~~[[θ]]~~ for correcting said distortion in the vertical direction of said original image by performing a vertical one-dimensional interpolation operation using a vertical correcting parameter ~~parameters~~ indicating a correction quantity ~~distance~~ in the vertical

direction to shift ~~[[at a]] pixel~~pixels ~~point constituting in~~ said horizontally corrected image~~original image to an image obtained at said first step.~~

15. (Currently Amended) The image processing method according to claim 14,
~~characterized in that~~wherein:

said original image is expanded and contracted in the horizontal direction by adjusting
distances, calculated by said horizontal one-dimensional interpolation operation,~~an interval~~ in the
horizontal direction by which image data at ~~[[of]]~~pixel points is shifted~~at which image data is~~
~~obtained by said one-dimensional interpolation operation at least at said first step; or~~

said original image is expanded and contracted in the vertical direction ~~at said second step~~
by adjusting distances, calculated by said horizontal one-dimensional interpolation operation,~~an~~
~~interval~~ in the vertical direction by which image data at ~~[[of]]~~pixel points is shifted~~at which said~~
~~image data is obtained by said one-dimensional interpolation operation.~~

16. (Currently Amended) The image processing method according to claim 14,
~~characterized by further comprising:~~

a storing step of storing ~~[[a-]]~~the horizontally corrected image ~~obtained by the correction of~~
~~said horizontal correcting means to~~ in a storing means;

wherein said ~~second vertical correction step~~ includes further comprises:

a data obtaining step of obtaining from said storing means said horizontally corrected
~~image according to said vertical correcting parameter, and~~

an interpolation operating step of performing ~~[[a-]]~~the vertical one-dimensional interpolation operation using said vertical correcting ~~parameter~~parameters to said horizontally corrected image data obtained by said data obtaining step.

17. (Original) An image processing method for correcting an original image having distortion, characterized by comprising:

a first step of performing grid split to said original image according to a control signal supplied from a user interface;

a second step of selectively encoding correction quantities in the horizontal direction and in the vertical direction at a grid point obtained by said grid split;

a third step of decoding said encoded correction quantities in the horizontal direction and in the vertical direction;

a fourth step of performing a one-dimensional interpolation operation to said original image in the horizontal direction according to a decoded correction quantity in the horizontal direction; and

a fifth step of performing a one-dimensional interpolation operation to said original image in the vertical direction according to a decoded correction quantity in the vertical direction.

18. (Original) The imaging processing method according to claim 17, characterized in that said third step includes:

a grid frame determining step of determining a grid frame enclosing each pixel point of a generated image, according to a grid generated at said first step; and

a parameter calculating step of approximating each grid frame determined at said grid frame determining step by means of a function, and for calculating said correction quantities in the horizontal direction and in the vertical direction at each pixel point constituting said generated image by means of said function.

19. (Original) The image processing method according to claim 18, characterized in that, at said parameter calculating step, at least one grid frame is approximated by means of an n -th order polynomial (n is a natural number).

20. (New) The image processing apparatus according to claim 3, wherein:

said horizontal correcting means performs said horizontal one-dimensional interpolation operation by fitting said horizontal correcting parameters for the designated pixels into a quadratic polynomial, which is then used as the basis to determine the distance by which to move image data at pixels between the designated pixels; and

said vertical correcting means performs said vertical one-dimensional interpolation operation by fitting said vertical correcting parameters for the designated pixels into a quadratic polynomial, which is then used as the basis to determine the distance by which to move image data at pixels the designated pixels.

21. (New) The image processing method according to claim 14, wherein:

said horizontal correcting step performs said horizontal one-dimensional interpolation operation by fitting said horizontal correcting parameters for the designated pixels into a quadratic

polynomial, which is then used as the basis to determine the distance by which to move image data at pixels between the designated pixels; and

said vertical correcting step performs said vertical one-dimensional interpolation operation by fitting said vertical correcting parameters for the designated pixels into a quadratic polynomial, which is then used as the basis to determine the distance by which to move image data at pixels between the designated pixels.

22. (New) The image processing apparatus according to claim 3, wherein:

the grid splitting means for performing a grid split on the original image, creates a grid coarser than the original image such that the width of each grid in pixels along the x and y axes is an exponent of 2.

23. (New) The image processing method according to claim 14, wherein:

the grid splitting step for performing a grid split on the original image, creates a grid coarser than the original image such that the width of each grid in pixels along the x and y axes is an exponent of 2.